

WHAT IS CLAIMED IS:

1. A surgical apparatus for delivering fluid to treat a lesion comprising:
an elongated member having a distal tip and a plurality of openings formed in a sidewall proximal of the distal tip;
a plurality of fluid delivery members movably positioned in the elongated member, each of the fluid delivery members having a lumen and at least one opening communicating with the lumen for delivering fluid to the lesion; and
an actuator operatively associated with the fluid delivery members, the actuator actuatable to a first position to move the fluid delivery members from a retracted position within the elongated member to a first deployed position extending radially with respect to the elongated member and actuatable to a second position to move the fluid delivery members from the first deployed position to a second deployed position extending further radially from the elongated member, the fluid delivery members being retained in the first and second deployed positions by a retention member.
2. The apparatus of claim 1, wherein the distal tip of the elongated member is a sharp tip configured to penetrate tissue.
3. The apparatus of claim 2, wherein each of the plurality of fluid delivery members has a sharp tip configured to penetrate tissue.
4. The apparatus of claim 1, wherein the actuator is axially slidable to move the plurality of fluid delivery members between the retracted, first deployed and second deployed position.
5. The apparatus of claim 1, wherein in the first and second deployed positions, a distal end of the fluid delivery member does not extend distally of the distal tip of the elongated member.
6. The apparatus of claim 5, wherein the plurality of fluid delivery members are composed of shape memory metal.

7. The apparatus of claim 1, wherein one of the plurality of fluid delivery members is extendable to a deployed position in substantial alignment with a longitudinal axis of the elongated member.

8. The apparatus of claim 7, wherein the fluid delivery member extendable in substantial alignment with the longitudinal axis has a diameter less than a diameter of the other fluid delivery members which are extendable radially at an angle to the longitudinal axis.

9. The apparatus of claim 7, further comprising an elongated guide fixedly mounted within the elongated member, the fluid delivery member extendable in substantial alignment with the longitudinal axis slidably received within a lumen of the guide.

10. The apparatus of claim 1, wherein the retention member comprises a tab engageable in one of a plurality of recesses.

11. The apparatus of claim 10, wherein the tab is mounted on the actuator and engages one of a plurality of recesses formed in a housing through which the actuator is slidably received.

12. The apparatus of claim 1, further comprising a support tube slidably mounted within the elongated member and operatively connected to the actuator, the plurality of fluid delivery members connected to the support tube.

13. The apparatus of claim 1, further comprising a visible indicator to indicate the position of the plurality of fluid delivery members.

14. The apparatus of claim 1, wherein the at least one opening in the fluid delivery members is formed in a sidewall of the member and includes multiple openings in the sidewall.

15. A surgical apparatus for delivering fluid for tumor ablation comprising:
an elongated member extending having a longitudinal axis, a lumen, and a plurality of openings spaced proximally of a distalmost end of the elongated member;
first, second and third fluid delivery members movably positioned in the lumen of the elongated member, the first and second fluid delivery members each having a lumen and at least one opening in a sidewall thereof communicating with the lumen of the fluid delivery member for delivering ablation fluid to the lesion, the first and second fluid delivery members movable between a retracted position, a first deployed position and a second deployed position, wherein the first and second fluid delivery members are substantially aligned with a longitudinal axis of the elongated member in the retracted position and extend through respective openings in the elongated member at an angle to the longitudinal axis of the elongated member in the first and second deployed positions, and the third fluid delivery member is substantially aligned with a longitudinal axis of the elongated member in a retracted position and in a deployed position.
16. The apparatus of claim 15, wherein the third fluid delivery member has an outer diameter smaller than an outer diameter of the first and second fluid delivery members.
17. The apparatus of claim 15, further comprising an elongated guide fixedly mounted within the elongated member, the third fluid delivery member extendable in substantial alignment with the longitudinal axis and slidably received within a lumen of the guide.
18. The apparatus of claim 16, wherein the third fluid delivery member is proximal of the distalmost tip of the elongated member in the deployed position and the first and second fluid delivery members each have a distal tip, wherein the distal tip is proximal of the distalmost end of the elongated member in the deployed positions.
19. The apparatus of claim 18, wherein the distalmost end of the elongated member and the distal tip of the first and fluid delivery members are sharp to penetrate tissue.

20. The apparatus of claim 15, further comprising a plug positioned in the elongated member and substantially flush with a distal edge of the elongated member to prevent coring of tissue as the elongated member is inserted.

21. A surgical apparatus for delivering fluid to treat a lesion comprising:
a housing;

an elongated member extending from the housing and having a distal tip and a plurality of openings in a sidewall;

first and second fluid delivery members positioned in the elongated member, each of the fluid delivery members having a lumen and at least one opening communicating with the lumen for delivering fluid to the lesion, the first and second fluid delivery members movable between a retracted position, a first deployed position and a second deployed position through the respective openings in the sidewall of the elongated member, wherein in the first and second deployed positions a distal tip of the fluid delivery members does not extend past a distal tip of the elongated member;

an actuator operatively associated with the fluid delivery members, the actuator movable to move the first and second fluid delivery members from the retracted position to the first deployed position extending radially with respect to the elongated member and further movable to move the first and second fluid delivery members from the first deployed position to the second deployed position extending further radially with respect to the elongated member, in the deployed positions the first and second fluid delivery members extending through the respective openings in the sidewall of the elongated member; and

a visual indicator to indicate the position of the first and second fluid delivery members.

22. The apparatus of claim 21, further comprising a third fluid delivery member movable substantially longitudinally between a retracted position and a deployed position.

23. The apparatus of claim 21, wherein the visible indicator comprises an indicator visible through a window in the housing to indicate whether the fluid delivery members are deployed in the retracted, first or second deployed positions.

24. The apparatus of claim 21, wherein the visible indicator comprises a marking at a proximal end of the apparatus to indicate the radial orientation of the fluid delivery members.

25. The apparatus of claim 24, wherein the marking is alignable with a skin mounted patch through which the apparatus passes.

26. The apparatus of claim 21, further comprising a depth indicator slidably mounted on the elongated member.

27. A surgical apparatus for delivering fluid to treat a lesion comprising:
an elongated member having a sharpened distal tip, a plurality of openings formed in a sidewall proximal of the distal tip, the elongated member having a cross-sectional circumference of between about .18 inches and about .22 inches;

a plurality of hollow fluid delivery members movably positioned in the elongated member, each of the fluid delivery members having a penetrating tip, a lumen and at least one opening communicating with the lumen for delivering fluid to the lesion, each of the fluid delivery members having a cross-sectional circumference of between about .030 inches and about .040 inches; and

an actuator operatively associated with the fluid delivery members, the actuator actuatable to a first position to move the plurality of fluid delivery members from a retracted position within the elongated member to a first deployed position extending radially with respect to the elongated member and actuatable to a second position to move the plurality of fluid delivery members from the first deployed position to a second deployed position extending further radially from the elongated member.

28. A method for treating a lesion comprising:

inserting an apparatus adjacent the lesion;

advancing an actuator in a first direction to deploy a plurality of tines radially through side openings in the apparatus such that a distal tip of the tines does not extend distally of a distal tip of the apparatus; and

injecting acetic acid through a lumen in the tines and through a plurality of side openings in the tines to ablate the lesion.

29. The method of claim 28, wherein the plurality of tines are composed of shape memory material and the method further comprises the step of injecting saline through the tines prior to deployment, the tines returning to a shape memory configuration in response to warming by body temperature.

30. The method of claim 29, wherein advancing the actuator advances a tine longitudinally to a substantially straight deployed positioned proximal of the distal tip of the apparatus.